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4th Generation M3 Introduction

Model: E90, E92

Production: 2/2008

OBJECTIVES

After completion of this module you will be able to:

- Identify key changes to the M3
- Obtain general information on the new M3

The new BMW M3

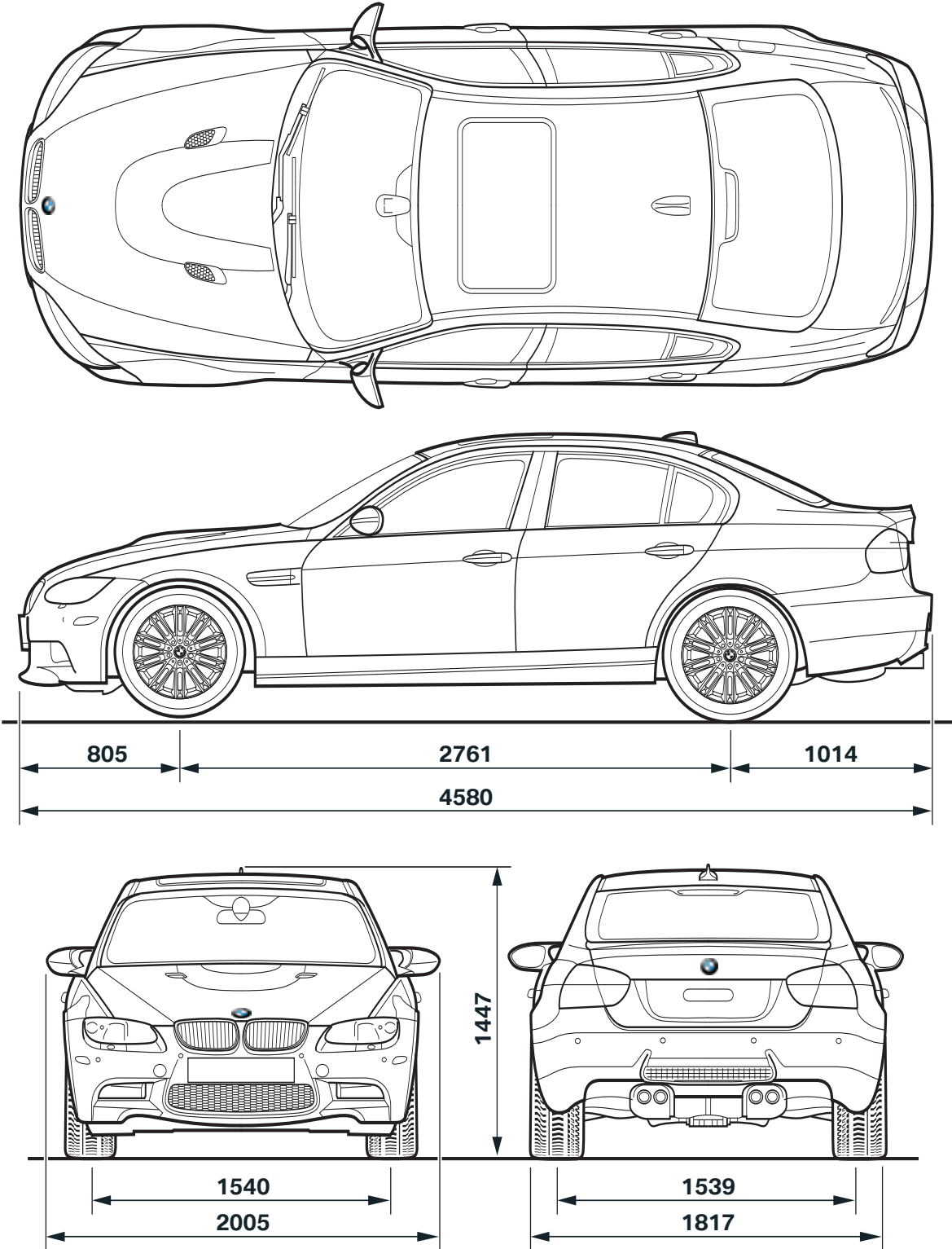
A new addition to the 'M' family has just arrived. The new BMW M3. A simple letter and number combination which has become synonymous with an extremely powerful and dynamic performance car.

The M3 is now in its fourth generation with a history of success in the world of motor sport, winning races across the globe since its beginning back in 1985. Not only has the race version of the M3 gained a successful motor sports heritage, its on road credentials live up to the expectations and demands of today's M3 drivers. The E92 M3 will be launched in the spring of 2008.

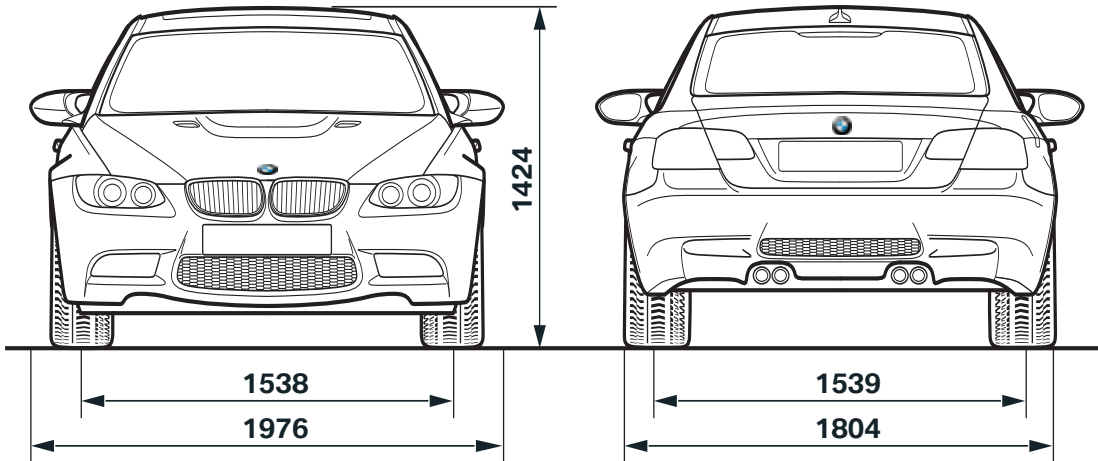
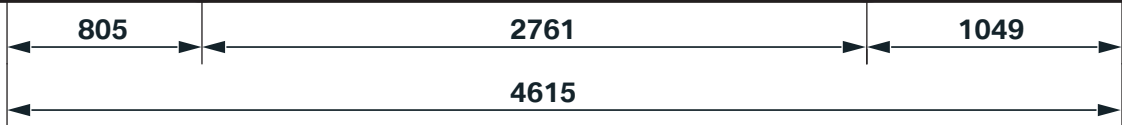
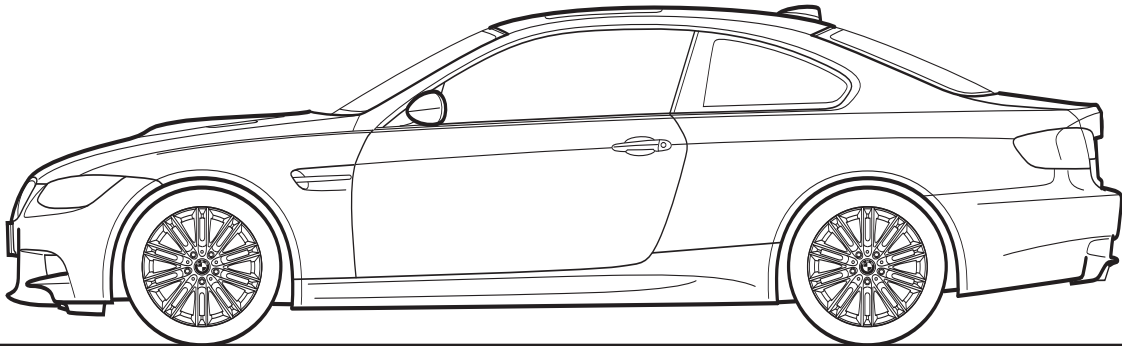
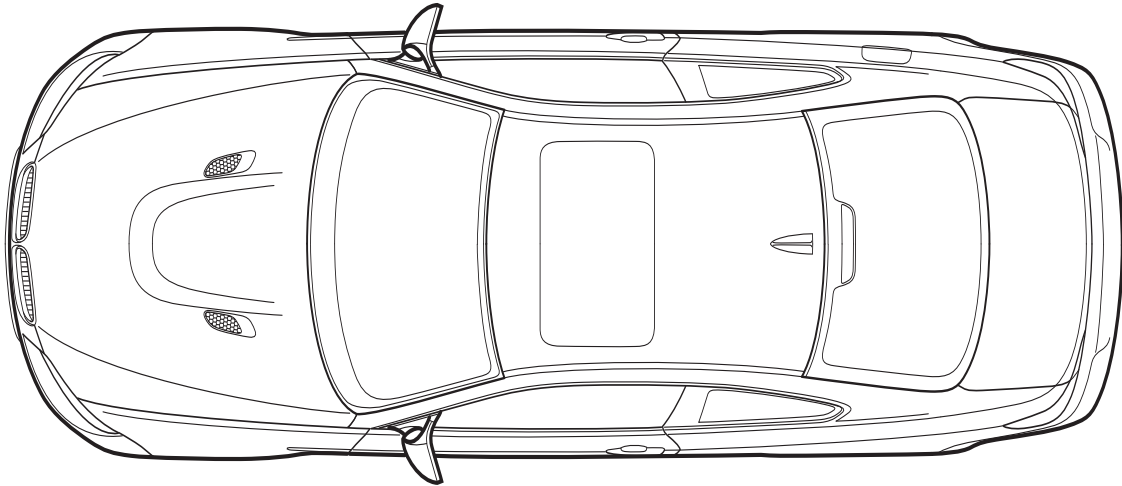
This precisely balanced sports car will set new benchmarks in driving dynamics for sport coupes. As with its predecessor the focus has been on optimizing the power to weight ratio whilst maintaining the high engine speed concept. This combination ensures that both power and driving agility are exceptional, placing the M3 in an even higher level of sport car competition.



E90 M3 Dimensions and Vehicle Data



E92 M3 Dimensions and Vehicle Data



M3 Heritage

E30 M3



1988 - 1991

From 1988, the first M3 generation turned the world of racing upside down. One year prior, the M3 had been launched as a thoroughbred sports car for the road.

Powered by a four-cylinder four-valve engine, the original M3 showed its sporting ambitions in its exterior design: flared wheel arches and a large rear spoiler gave it lots of road presence.

Engine Configuration:	4 cylinders, in-line
Capacity:	2.3 liters
0-62:	6.8 sec
Top Speed:	145 mph
Performance:	192 hp @ 6,750 rpm
Torque:	230 Nm (169 lb-ft) @ 4,750 rpm

E36 M3



1995, 1996-2000

Family affair: the second-generation M3 was offered as a complete model series.

First came the Coupé, two years later the Convertible and Sedan. And the engine received a nice boost, too: the four-valve six-cylinder unit delivered 240 hp.

	1995	1996-2000
Engine Configuration:	6 cylinders, in-line	6 cylinders, in-line
Capacity:	3.0 liters	3.2 liters
0-60:	6.1 sec.	5.9 sec.
Top Speed:	128 mph	128 mph
Performance:	240 hp 6,000 rpm	245 hp @ 6,000 rpm
Torque:	305 Nm @ 4,200 rpm 225 lb-ft @ 4,200 rpm	319 Nm @ 3800 rpm 236 lb-ft @ 3800 rpm

E46 M3



2001 - 2006

The third generation of the M3 enters the stage: with the M3 Coupé and the high-revving naturally aspirated engine delivering 333 hp at up to 8,000 rpm, BMW once more introduced a true sports car, which, like its predecessor, was crowned “best handling car”. From 2001, BMW added the convertible version.

Engine Configuration:	6 cylinders, in-line
Capacity:	3.2 liters
0-60:	4.8 sec.
Top Speed:	155 mph
Performance:	333 hp @ 7,900 rpm
Torque:	355 Nm (262 lb-ft) @ 4,900 rpm

E92 M3



2007

BMW M3 Reloaded. With a new naturally aspirated V8 engine, suspension and drivetrain, a convincing design and best-in-class performance, the latest generation of the BMW M3 is once again making headlines. A true sports car with fantastic everyday usability. The successor takes over the lead: the new BMW M3.

Engine Configuration:	8 cylinders, V configuration
Capacity:	4.0 liters
0-60:	4.7 sec. (coupé) - 4.8 sec. (sedan)
Top Speed:	155 mph
Performance:	414 hp @ 8,300 rpm
Max Torque:	400 Nm (295 lb-ft) @ 3,900 rpm

M3 Concept

Body

In addition to the sporty and dynamic appearance in both the external design and the interior, the main features were weight optimization and a reinforced bodyshell for improved dynamic handling. A further outstanding feature of the E92 M3 is also once again the sophisticated aerodynamics typical of the M series.

M- Specific Equipment

Exterior: Front zone with generous air inlets, "Powerdome" engine hood with air inlet, carbon roof, side gills, outside mirrors, sill, wheel rim design, extended wheel arches, and the boot with spoiler and four exhaust tailpipes all combine to provide the initial impression.

Interior: Sill trim strips, seats, steering wheel, instrument cluster, switches in the center console and the gear lever design all increase the anticipation.

Engine

Under the engine hood, the 8-cylinder power pack is the high-speed S65B40.

With individual throttle butterflies, a generous intake air and exhaust manifold, and many more refined M-specific features such as the MSS60 engine control, the S65B40 is once again an outstanding highlight of the M series.



Drive

Double-disc clutch, 6-gear manual transmission and the fully variable M limited-slip differential ensure the forward momentum.

Chassis and Suspension

Front and rear axles with new suspension geometry and M-specific suspension settings with 18" tires.

Specific objectives of the development were weight optimization, and in particular, control of the longitudinal and lateral acceleration/power that is generated when enjoying the pleasure of driving the M3.

The M3 brake with compound brake discs, new high-performance brake pads and standard M series ABS/DSC guarantee optimum braking efficiency and active safety.

Electrical System

The electrical equipment and bus structure of the M3 are based on the E92.

The optional MDrive menu can be used to preset/configure the standard Servotronic and the M engine dynamics control (enhanced with "Sport Plus"), the optional electronic damper control EDC-K (in the E9x series only available in the M3) and the DSC M dynamic mode.

In the E9x series, the BMW Individual High End audio system is offered for the first time in the M3.



Engine and Technical Data

V8 with High Engine Speed Concept

It will be the first time that a V8 engine has been fitted in a series production M3. The main concept behind this high-revving, high performance engine with a sporty sound is the extremely light, rigid and robust construction which is capable of reaching extreme engine speeds of up to 8,400 rpm. The engine achieves an impressive 400 hp (roughly 100 hp per liter).

The S65B40 is derived from its big brother, the S85B50. The main changes can be seen in the engine oil system, VANOS valve gear system and air intake system. Special consideration has also been given to engine weight optimization.

The engine with all its assemblies is built in the special engine production area of the Munich BMW plant.

One standard engine is used throughout the world and adapted to suit specific market requirements.



A New Dimension

The M engineers consider the high engine speed concept to be the most intelligent strategy of obtaining the maximum thrust from a vehicle.

For example, in a modern formula 1 engine, the crankshaft works at up to 19,000 rpm (resulting in piston speeds of over 25 meters per second).

The actual thrust at the driven wheels is the decisive factor for car acceleration. This thrust is achieved by the engine speed, the torque and the short gear ratio.

This concept has been adopted for vehicles in the 'M' range from motor sport. The fully variable M limited-slip differential means that the thrust is optimally distributed to the live axle.

Furthermore, the S65B40 also includes the established M-specific features such as double VANOS, individual throttle butterflies and high-performance engine electronics (MSS60 control unit).



S65B40 View of the Intake Manifold



S65B40 View of the Intake Flutes

Technical workarounds by increasing the cylinder capacity or boosting become excessive, thus avoiding the increased engine weight and consumption often associated with these methods.

The high engine speed concept helps to achieve dynamically agile handling and the maximum in sports driving performance characteristics.

A maximum torque of 400 Newton meters at 3,900 rpm is reached. Approx. 85 percent (340 Nm) can be utilized beyond the enormous engine speed range of 6,500 rpm.

The S65B40 attains 8,400 rpm, and therefore a value that was previously only reserved for racing car engines or exotic custom vehicles.

Note: For safety reasons, due to the engine dynamics when the vehicle is stationary (i.e. without a road-speed signal), it is already down-controlled at 7,000 rpm to prevent the engine speed from increasing into an impermissible range.

Overview of Special Features

Body:

- M3 Front and rear apron
- Carbon fiber roof in carbon optic, if no optional sliding/tilt sunroof (body color)
- Gills in front side panels
- M3 outside mirrors
- Aluminum hood with "Power Dome" and air inlet
- M dome braces, thrust panel and underbody V-brace
- Weight-optimized bumper brackets, front and rear
- Optimized heat isolation package
- Optimized noise isolation package
- Optimized underbody paneling, front and rear

Interior:

- M3 steering wheel
- M gear lever
- M driver foot supports
- M3 seats
- Lighter floor trim (carpet)
- Lightweight design through-loading in rear



Electrics-:

- M3 Instrument cluster
- M-specific switches for gear lever in the center console
- Buttons for the tire pressure system between center air conditioning outlets
- Intelligent alternator control (IGR)
- AGM battery

Engine:

- New high-engine-speed concept V8 engine S65B40 with MSS60 engine control system
- M3 Air intake guide
- M Individual throttle butterflies
- M Ion-flow combustion monitoring
- M VANOS
- M3 Exhaust system

Drive:

- Dual-disc clutch used in an M3 for the first time
- M 6-gear manual transmission
- Fully variable M differential with locking action

Chassis:

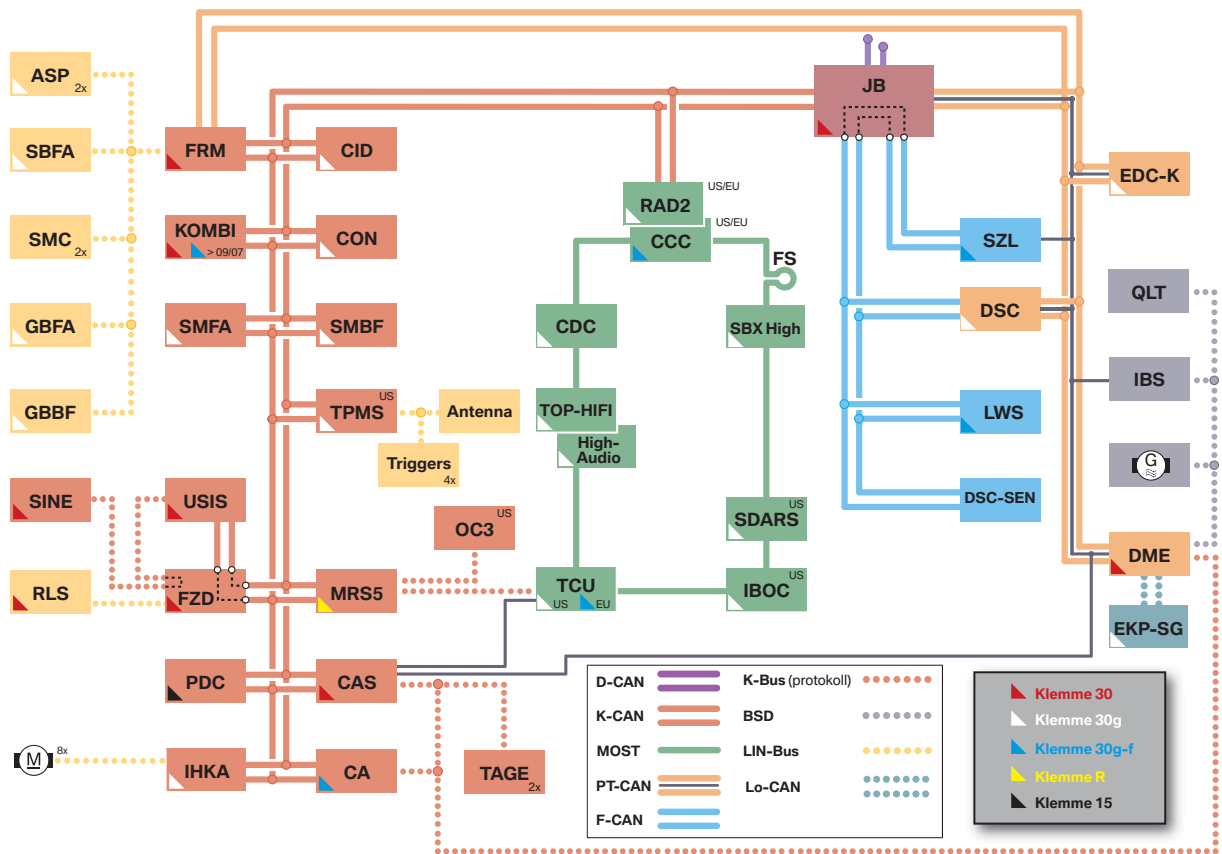
- M3 Rims, tires
- M3 Compound brake system
- Adapted front axle carrier, M front axle components
- Servotronic hydraulic steering, M steering gear ratio
- Adapted rear axle carrier, M rear axle components
M-specific options:
- MDrive menu
- EDC-K
- 19" M3 rims, tires (optional)
- Seat back width adjustment (passive)
- Enhanced leather interior
- High speed down-control option 7ME "M Driver's Package" (280 km/h)

System Overview

Vehicle Electrical System

The vehicle electrical system is based on the E92 series production vehicle system and has been adapted for the M3.

Vehicle Electrical System and Terminal Status Overview



Index	Explanation	Index	Explanation
ASP	Outside mirrors	IHKR	Integrated heating/air conditioning system
CA	Comfort Access	JB	Junction box
CAS	Car Access System	KOMBI	Instrument cluster
CCC	Car Communication Computer	LWS	Steering angle sensor
CDC	(Compact) CD changer	M-ASK	Multi-audio system controller
CID	Central information display	MRS5	Multiple restraint system, 5th generation
CON	Controller	OC3	Seat occupancy detector mat (US)
DAB	Digital Audio Broadcast	PDC	Park distance control
DME	Digital motor electronics	QLT	Quality, level, temperature oil sensor
DSC	Dynamic Stability Control	RAD	Radio1 or Radio2
DSC-SEN	DSC sensor	RLS	Rain light sensor
SINE	Emergency current siren/tilt	SBFA	Switch block, driver's door
EDC-K	Continuous Electronic Damping Control	SBX	Interface box (ULF functionality)
EKP	Electric fuel pump control unit	SBX High	Interface box High (Bluetooth telephony, voice input and USB/audio interface)
FLA	High beam assistant	SDARS	Satellite tuner (US only)
FRM	Footwell module	SMBF	Passenger's seat module
FS	MOST direct access	SMC	Stepper motor controller
FZD	Roof function center	SMFA	Driver's seat module
GBBF	Seat belt extender controller, front passenger	SZL	Steering column switch cluster
GBFA	Seat belt extender controller, driver	TAGE	Outside door handle electronics
High - Audio	BMW Individual High End Audio system	TCU	Telematics Control Unit
IBOC	In Band On Channel (Digital Radio)	TOP-HiFi	Top-HiFi amplifier
IBS	Intelligent battery sensor	USIS	Ultrasonic passenger-compartment sensor
IHKA	Integrated automatic heating/air conditioning system	VM	Video module (only for US)

The MDrive

The MDrive menu known from the M5/M6 is also available in the M3 if equipped with the navigation system.

Starting from the iDrive main menu, the MDrive menu can be called up by pressing on the iDrive controller and selecting M settings.

The overall setting is called up/activated by pressing on the M button on the steering wheel. Pressing the M button again or restarting the vehicle deactivates the settings. The settings can, of course, be retrieved again using the M button.

The following is a list of menu items with selection options that are currently available in the MDrive menu:

- M Engine Dynamics Control (Power)
 - "Unchanged"
 - "Normal"
 - "Sport"
 - "Sport Plus"
- DSC
 - "Unchanged"
 - "OFF"
 - "ON"
 - "M Dynamic mode"
- Servotronic
 - "Normal"
 - "Sport"
- EDC-K (only if fitted)
 - "Unchanged"
 - "Comfort"
 - "Normal"
 - "Sport"

By selecting "Unchanged", when the M button is pressed (i.e. the settings in the MDrive menu are called up), the current settings of this system are retained.

Example:

The driver has deactivated the Dynamic Stability Control function using the DSC button.

- MDrive setting: M Engine dynamics control "Sport Plus"; DSC "Unchanged"; Servotronic "Sport".

The driver presses the M button on the steering wheel to call up the M settings.

- Only the "Sport Plus" and Servotronic "Sport" settings for M engine dynamics control are activated. DSC remains deactivated.

Menu Item Details

M Engine Dynamics Control (Power)

Apart from "Unchanged", three engine control programs are available; "Normal", "Sport" and "Sport Plus".

The options determine how spontaneously the engine responds to actuation of the accelerator pedal. The maximum engine power is not changed.

Using the power button in the center console, the driver can only choose between "Normal" and "Sport".

"Sport Plus" is only available in the MDrive menu.



DSC

Apart from the "Unchanged" setting, in the DSC submenu, the options "OFF" "ON" and "M Dynamic mode" can be selected.

If "M Dynamic Mode" is selected, the Dynamic Stability Control (DSC) permits higher slip values at the wheels. The system does not activate the stabilizing function until very close to the handling limit range, when it influences engine output and/or actively engages the brakes.

In "OFF" mode, an experienced sports car driver can also completely deactivate the DSC function.

Using the DSC button in the center console, the driver can switch between "OFF" and "ON" or if "M Dynamic Mode" is active, between "M Dynamic Mode" and "OFF".

"M Dynamic Mode" is only available in the MDrive menu.

EDC-K

If option 223 continuous Electronic Damper Control is fitted together with MDrive, in addition to "Unchanged", three EDC programs can be selected in the MDrive menu: "Comfort", "Normal" and "Sport".

The driver can use the EDC button in the center console to switch sequentially between the three programs.

Servotronic

The settings that can be selected for the Servotronic steering function are "Normal" and "Sport". Depending on the selection, the appropriate characteristic curve for power assisted steering is active.

This selection option is only available in the MDrive menu. Without MDrive, the customer has no option, and a fixed programmed speed dependent characteristic curve is used.

"Key-Dependent Settings" Menu

Under "M settings", the "Key-dependent settings" menu is also available as well as the MDrive menu.

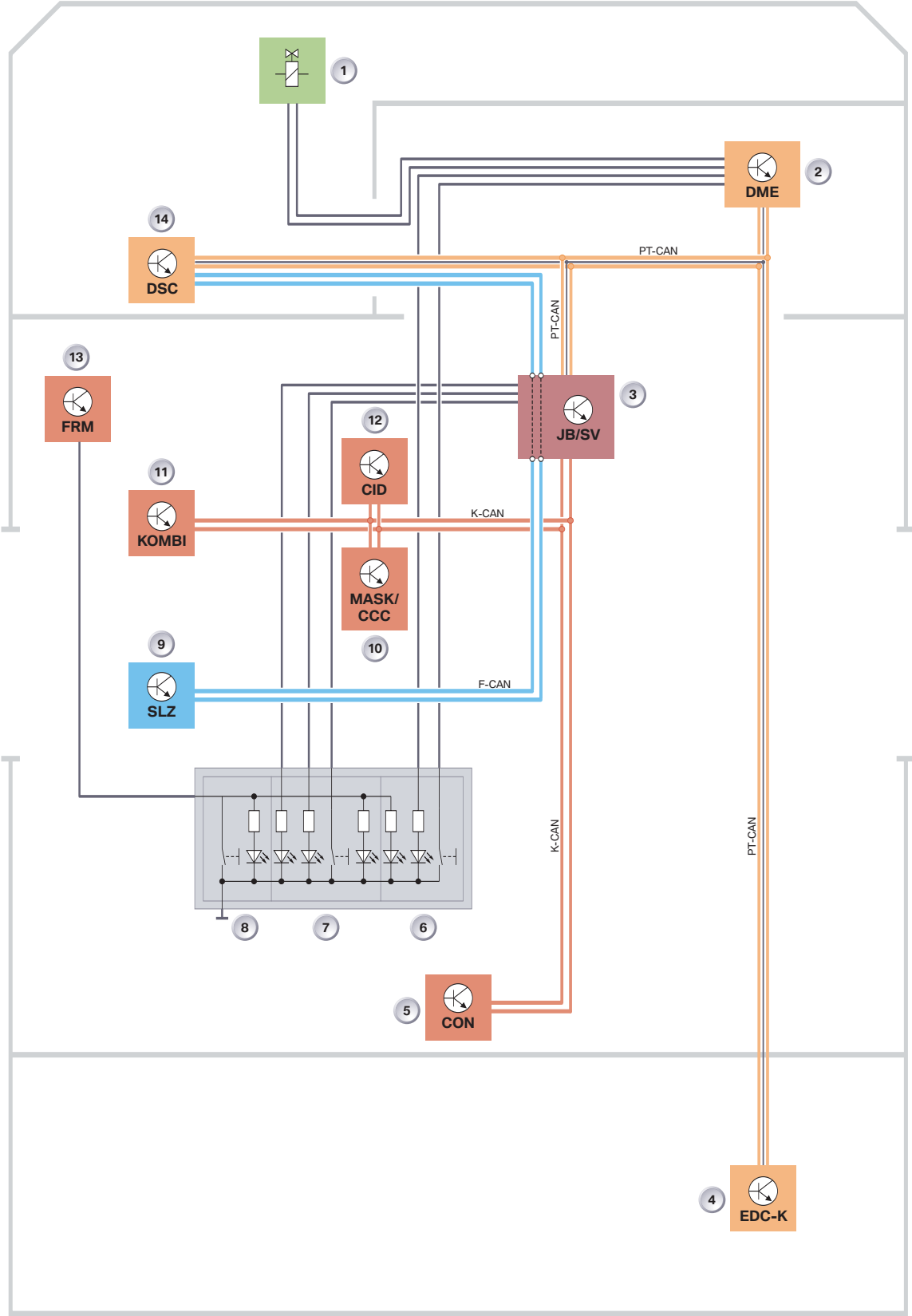
This allows key-specific settings for certain MDrive menu items.

M engine dynamics control and EDC settings are currently possible, which are assigned to the specific key used during the configuration (configuration => ZV closing action => memorizing).

Under the M engine dynamics control menu item, "Normal" or "Sport" can be selected.

In the EDC menu item, the options "Comfort", "Normal" or "Sport" can be selected.

M Drive Bus Diagram



Index	Explanation
1	Servotronic valve
2	DME MSS60
3	Junction Box distribution box
4	Electronic Damping Control controller
5	iDrive controller
6	POWER button
7	EDC button
8	DSC button
9	Steering column switch cluster
10	Multi audio system controller/Car Communication Computer
11	Central Information Display
12	Instrument cluster
13	Footwell module
14	Dynamic Stability Control